CLAIMS

1. A method for controlling a robot in an application comprising a plurality of robots (33a-n) carrying out an operation on one or more work objects (39) in a common workspace, wherein instructions for a plurality of movements are recorded in a program controlling said robot, **characterised** by controlling said robot dependent upon whether said robot or any other robot in the common workspace is proceeding as predetermined, according to a sensed or measured common reference value (43', 64, 74), or not.

2. A method according to claim 1, **characterised** by
-checking (42, 61, 71) a value for a common reference for said robot before the start of the next task,
-providing a signal (47, 47b, 62, 72) to said robot to stop and wait (43, 64, 74) at the end of the present task if the common reference value is not within acceptable limits.

3. A method according to claim 1, **characterised** by
-determining said plurality of movements as a plurality of tasks,
-checking (42, 61) a value for a position reference for said robot before the start of the next task,
-providing a signal to said robot to stop and wait (44b, 64) at the end of the present task if the position reference value is not within acceptable limits.

4. A method according to any of claims 1-3, **characterised** by
-checking (44b, 71) a reference value (64) or other operational status for at least one other robot of said plurality of robots (33a-n), and
-providing a signal to stop and wait (74) at the end of the present task if at least one other robot has a status of waiting or stopped.

5. A method according to claim 4, **characterised** by determining the value of the position reference for the first said robot by:

-sampling an output of a sensor member (92) arranged for measuring a position of a target located on one of said one or more work objects,

-comparing the measured position of the target to a predetermined target position,

-registering, if the measured target position is not within acceptable limits, the status of the position reference as not acceptable.

6. A method according to claim 5, **characterised** in that the target position on the work object is recorded for the beginning of each task in said plurality of movements recorded in said program and saved in an array or other memory storage.

7. A method according to claim 6, **characterised** by adjusting, by means of a program editing application, the target position of the work object after the first recording dependent on a manual comparison.

8. A method according to claim 7, **characterised** by adjusting, by means of a program editing application, the target position of the work object after the first recording dependent on a graphical comparison carried out using the program editing application.

9. A method according to claim 1, **characterised** by setting an indicator for a common reference in a program for any of said robot of said plurality of robots to a status of **not** acceptable or flag high (44b, 64, 74) which such common reference indicator status is detectable by other controllers or robot controllers.

10. A method according to any of claims 1-4, **characterised** by setting an indicator in a program for first said robot to a status of not acceptable or flag high, which such indicator status is detectable by other controllers or robot controllers.

11. A method according to claim 9 or 10, **characterised** by re-setting the indicator in a program or the program for first said robot and thus removing the not acceptable status.

12. A method according to claim 9 or 10, **characterised** by re-setting the indicator in a program or the program for first said robot from not acceptable to acceptable, which such indicator status is detectable by other controllers or robot controllers.

13. A method according to claim 1, **characterised** in that the common reference is based on any of the list of: movement of a transport member of a work object, a time period, a time stamp, a measure of task completion, a measure of job completion.

14. A method according to any of claims 2-5, **characterised** in that the position reference value for the first robot is checked at a time just before the first robot shall proceed to a subsequent task.

15. A method according to claim 14, **characterised** in that a reference value (64, 74) for the any of said plurality of robots is checked according to a configured time value dependent on a Movement Program (21, 85) for the first robot.

16. A method according claim 15, **characterised** in that the reference value (64, 74) for the any of said plurality of robots is checked according to a configured time value of the

Movement Program for the first robot dependent on a task or movement carried out by any other one of said plurality of robots (33a-n).

17. A method according to claim 5, **characterised** in that the measured position of said target is a current position.

18. A method according to claim 5, **characterised** in that the measured position of said target is, in part, a calculated position.

19. A method according to claim 1, **characterised** by a robot controller determining that the common reference value measured or sensed (92, 93) is lower than the stored value, and making the robot wait until the reference value is larger than or equal to the stored reference before continuing.

20. A method according to claim 1, **characterised** by a robot controller determining that the common reference value measured or sensed (92, 93) is higher than the stored reference value, sending a signal to the external reference controller and/ or time keeper that a robot so controlled is late and the conveyor should be halted or the time reference stopped until the robot has caught up and attained an acceptable reference value.

21. A method according to any previous claim, **characterised** in that the acceptable values for the reference value comprise a pre-set window with configurable tolerance limits.

22. A control **device** (81) for controlling a robot in an application comprising a plurality of robots, operating on one or more work objects in a common workspace, **characterised** in that said control device (81) comprises:

-a program member (85, 85a) for determining or detecting a value for a common reference (43) for said robot before the start of the next task,

-a logic member (85) for making, if the measured target position is not acceptable, a decision that the robot shall stop and wait,

-an output member (82) arranged capable to provide a signal to said robot comprising an instruction to wait.

23. A control device according to claim 22, **characterised** by comprising a program member (86) for determining or detecting a value for a position reference (64) for said robot before the start of the next task.

24. A control device according to claim 23, **characterised** by comprising program member (87) for determining or detecting a value of a reference (74) for at least one other robot of said plurality of robots (33a-n), before the start of the next task.

25. A control device according to claim 23, **characterised** by comprising a processor member (83).

26. A control device according to claim 23, **characterised** by comprising at least one memory storage member (84, 89).

27. A control device according to claim 22, **characterised** by comprising one or more software members (86, 87, 85, 85a) for carrying out the steps of a method according to any of claims 1-21.

28. A control device according to claim 27, **characterised** in that at least one of the one or more software members is arranged to check a time reference value for any of the one or more robots.

29. A control device according to claim 26, **characterised** in that that at least one of the one or more software members is stored at least in part in the memory storage member of a control device.

30. A control device according to claim 29, **characterised** in that at least one of the one or more software members (85a, 86, 87) is stored, at least in part, in a memory storage means of a cell controller (31) or other robot control system.

31. A control device according to any of claims 22-30, characterised by comprising an I/O interface for wireless communication with at least one sensor and/or member of at least one robot.

32. A control system for controlling one or more robots in an application comprising a plurality of robots operating on one or more work objects in a common workspace, comprising a computer or processor and memory storage means, and one or more robot controllers (81), **characterised** by comprising:
-at least one robot controller (81) arranged capable to check a reference value (43, 64, 74) for of any of said plurality of robots (33a-n).

33. A control system according to claim 32, **characterised** in that the system is arranged with sensor members (92) to measure a position (41) of the one or more work objects and/or transport members for said work objects and/or a clock of time sensor (93) to measure elapsed time relative the one or more work objects and/or transport members for said work objects.

34. A control system according to claim 33, **characterised** in that the sensor members are arranged to provide a measurement of the position of a work object that at least one of said

plurality of robots shall operate on at the start of a task in a operating cycle or robot movement program (21).

35. A control system according to claim 34, **characterised** by a graphical user interface arranged to display and carry out actions in respect of at least one robot controller (81) or cell controller (31) controlling said plurality of robots by means of a movement program (21, 85, 85a) including tasks comprising one or more movements.

36. A control system according to claim 32, **characterised** in that a control member of the at least one robot controller is arranged to check a time reference value for at least one of said plurality of robots.

37. A computer program comprising computer code means and/or software code portions for making a computer or processor perform any of the steps of claims 1-20.

38. A computer readable medium comprising the computer program according to claim 37 recorded on it.

39. A computer program product comprising the computer program according to claim 37 comprised in one or more computer readable media.

40. A computer data signal for controlling one or more robots in an application comprising a plurality of robots operating on one or more work objects in a common workspace embodied in a carrier wave and comprising information about a reference value (43', 64, 74) used by at least one robot of said plurality of robots (33a-n) to determine whether one or more of the reference values is not acceptable and/or whether any of said plurality of robots are waiting or have stopped.

41. Use of a control device according to any of claims 22-31 for a operating a robot together with at least one other robot or in an application to paint any of the list of: car bodies, car parts, vehicle sub-systems.

42. Use of a control device according to any of claims 22-31 for a operating a robot or automation application (1) to carry out an operation comprising any from the list of: coating, welding, riveting, gluing, fettling, folding plate, cutting, bending plate, hemming plate, gripping an object, manipulating an object, stacking, pick and place.

43. Use of a control system according to any of claims 32-36 for a operating a robot or automation application (1) in an industrial or commercial installation including any installation for mining, chemical manufacturing or processing, power generation or transmission and distribution, oil or gas exploration, oil refining.

43. Use of a control system according to any of claims 32-36 for teaching and/or programming and/or verifying a program for at least one robot in an application comprising a plurality of robots (33a-n) for carrying out an operation on one or more work objects in a common workspace to carry out an operation comprising any from the list of: painting, coating, welding, riveting, gluing, fettling, cutting, folding plate, bending plate, hemming plate, gripping an object, manipulating an object, stacking, pick and place.